REMARKS

Claims 1-8, 19, 20, 31, 34 and 37-41 are now pending in the present application. Claims 1, 19, 20 and 31 have been amended and claims 37-41 have been added. Claims 9-18, 21-30, 32, 33, 35 and 36 have been canceled by the present amendment or by a previous amendment. Claims 1, 19, 20, 39 and 41 are independent. Reconsideration of this application, as amended, is respectfully requested.

Examiner Interview

An interview was conducted with the Examiner in charge of the above-identified application on April 6, 2004. Applicants greatly appreciate the courtesy shown by the Examiner during the interview.

In the interview with the Examiner, it was discussed to amend the independent claims to recite that the jetting was without masking or stenciling. Support in the specification for this recitation was also explained to the Examiner. The Examiner agreed that a recitation regarding the jetting being without masking or stenciling appeared to overcome the Fuller et al. reference. As the Examiner will note, independent claims 1, 19 and 20 have been amended to recite "said add-on jetting being performed without masking or stenciling." Accordingly, it is believed that these claims are in condition for allowance. This will be further discussed below with regard to the Examiner's prior art rejection.

During the interview with the Examiner, it was also suggested to amend the claims to recite that the viscous medium is solder paste. The Examiner indicated that this recitation also appears to overcome the prior art. As the Examiner will note, claims 37, 38 and 41 recite this aspect of the present invention. This recitation will be further disclosed below under the heading "Additional Claims."

It was also discussed during the interview with the Examiner to amend the claims to recite that the jetting of individual droplets of viscous medium was "one drop at a time." The Examiner recognized that the Fuller et al. reference did not teach this aspect of the present invention and also recognized that this recitation refers to a "drop-on-demand" jetting device. This recitation will also be discussed below under the heading "Additional Claims."

Finally, in the interview with the Examiner, it was suggested to amend the claims to recite "not flame spraying." The Examiner indicated that this recitation appears to be new matter. Although Applicants do not completely agree with the Examiner, as the Examiner will note, the claims have not been amended to include this recitation. However, Applicants reserve the right to recite this aspect of the present invention at a later date if it is so decided.

Reasons for Entry of Amendments

It is respectfully requested that the present amendments be entered into the official file in view of the fact that the amendments to the claims automatically place the application

into condition for allowance. In the alternative, if the Examiner does not believe that the application is in condition for allowance, it is respectfully requested that the Examiner enter the amendments for the purposes of appeal. The amendments to the claims simplify the issues on appeal by further defining the present invention over the references relied on by the Examiner.

Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 3, 4, 7, 8, 19, 20 and 31-33 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Fuller et al., USPN 3,962,487. Claims 2 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuller et al. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuller et al., as applied to claims 2 or 3 above and further in view of Itsuji, USPN 5,151,299. Claims 31-36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuller et al., as applied to claims 1, 19 or 20 above, and further in view of Teague, USPN 3,689,987. These rejections are respectfully traversed.

At the outset, it is respectfully pointed out that claims 32, 33, 35 and 36 have been canceled without prejudice or disclaimer of the subject matter contained therein. Accordingly, the Examiner's rejections under 35 U.S.C. §§ 102 and 103 have been rendered moot with regard to these claims.

The present invention is directed to a method of applying viscous medium onto a substrate. Independent claim 1 recites a combination of steps including "add-on jetting of

predetermined additional amounts of viscous medium on predetermined positions on the screen printed substrate, said add-on jetting being performed by without masking or stenciling." Independent claims 19 and 20 of the present invention are also directed to a method of applying viscous medium on a substrate, which recite the step of "jetting additional viscous medium onto the substrate, said add-on jetting being performed without masking or stenciling." Applicants respectfully submit that the references relied on by the Examiner fail to teach or suggest the presently claimed invention.

Support for the above recitations in independent claims 1, 19 and 20 can be found in the present specification at page 1, line 30 through page 2, line 18. This portion of the present specification describes the problems associated with the background art devices which requires a stencil to be used in order to add viscous medium to a substrate. Since the add-on jetting of the present invention does not require a stencil, the objects and advantages of the present invention can be accomplished. The present invention also supports the above recitation at page 4, line 30 through page 5, line 8 which indicates that the jetting of the present invention enables the application of viscous medium in patterns which are not possible through screen printing.

With regard to the inclusion of the term "masking" in the independent claims of the present invention, Applicants respectfully submit that this term would also be understood to one having ordinary skill in the art as being synonymous with the term stenciling. Masking and stenciling processes are very similar. Masking refers to the process of covering over portions of a substrate where a viscous medium is not to be applied. Stenciling also refers

to the same process, except that the process is performed by applying a stencil over the substrate, the stencil including multiple apertures at locations where the viscous medium is to be applied. When considering the result to be achieved by both masking and stenciling, the purpose of both masking and stenciling is to define where on substrate or the like the applied medium is to end up. If there is no masking or stenciling, the matter screen printed or flame sprayed would end up on everything that would come in the way of the screen printing or flame sprayed matter. Of course, this is inherent in Fuller et al., since it is stated at column 3, lines 30-34 that the coating material is screen printed onto selected limited portions of the flat disk surfaces, thereby forming ohmic contact layers. This would require a stencil between the squeegee of the screen printer and the disc surface. Furthermore, at lines 57-59 of column 4, it is stated that the additional metal coatings are formed on the ohmic contact layers by flame spraying. Of course, without masking of the portions that are not intended to be provided with the additional metal coatings, such metal coatings would end up on the entire disc surface, in all likelihood rendering the disc useless.

In view of the above, Applicants submit that the recitation of the add-on jetting being performed without masking or stenciling, which has been added to independent claims 1, 19 and 20 of the present invention, are fully supported by the present disclosure and are not taught or suggested by the Fuller et al. reference. In view of this, Applicants submit that the Fuller et al. reference fails to anticipate or render obvious the presently claimed invention.

With regard to dependent claims 2-8, 31 and 34, Applicants respectfully submit that these claims are allowable due to their dependence upon allowable independent claim 1, as well as due to the additional recitations in these claims.

With regard to the Examiner's reliance on the Itsuji and Teague references, these references fail to disclose add-on jetting being performed without masking or stenciling as recited in independent claims 1, 19 and 20 of the present invention. Accordingly, these references fail to make up for the deficiencies of Fuller et al.

In view of the above amendments and remarks, Applicants respectfully submit that claims 1-8, 19, 20, 31 and 34 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the Examiner's rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

Additional Claims

Additional claims 37-41 have been added for the Examiner's consideration. Applicants respectfully submit that additional claims 37 and 38 are allowable due to their dependence on allowable independent claim 1, as well as due to the additional recitations in these claims.

With regard to additional independent claim 39, Applicants respectfully submit that this claim is allowable since the Fuller et al. reference fails to disclose that the add-on jetting of viscous medium is "one drop at a time" as recited in this claim. Fuller et al. clearly fails to disclose this aspect of the present invention, since the add-on jetting of Fuller et al.

is applied through flame spraying. Applicants also submit that the recitation "one drop at a time" is fully supported by the present specification in view of the reference to published international application WO 99/64167 which appears at page 4, first full paragraph of the present specification. Referring to the WO 99/64167 reference, one having ordinary skill in the art would readily recognize that this reference discloses a drop-on-demand jetting device which would eject one drop of viscous medium at a time.

With regard to additional dependent claim 40, Applicants submit that this claim is allowable due to its dependence upon allowable independent claim 39 as well as due to the additional recitations in this claim. Specifically, claim 40 recites that the viscous medium applied through the add-on jetting is solder paste. Support for this amendment can be found at least at page 8, lines 13 and 14 of the present specification. In addition, Fuller et al. fails to disclose this aspect of the present invention as well.

Fuller et al. clearly does not mention flame spraying of solder paste. In addition, Applicants submit that solder paste cannot be flame sprayed. The above requires some understanding of the contents and purposes of solder paste. Solder paste generally comprises metal particles, solvent(s), flux and a consistency medium. The latter is provided for giving the solder paste an appropriate viscosity and stickiness. The purpose of the solder paste is to provide adhesion between the substrate and the contact elements of the components to be mounted onto the substrate. Following mounting, re-flow of the solder paste is accomplished, typically in an oven, which creates soldering joints from the metal particles (solder) present in the solder paste. During re-flow, the solder paste is

melted, the solvent evaporates and portions of the flux and consistency medium may also evaporate. Since during flame spraying, the matter to be flame sprayed is melted, solder paste can by definition not be flame sprayed. The molten matter cannot be regarded as a "paste" and at least some of the components in the solder paste would evaporate instead of being sprayed. Furthermore, if attempts were made to flame spray solder paste, the resulting matter ending up on a substrate would in no way have the desired characteristics of the solder paste, and would in no way be suitable for ensuing mounting of the components.

In view of the above, Applicants submit that the Fuller et al. reference fails to disclose add-on jetting of solder paste as recited in dependent claim 40 of the present invention. It should also be noted that additional dependent claims 37 and 38 include the recitation regarding solder paste. Accordingly, these claims are also allowable over the Fuller et al. reference for this additional reason.

With regard to additional independent claim 41, this reference recites add-on jetting of solder paste on predetermined positions on the screen printed substrate. For the reasons mentioned above with regard to dependent claim 40, Applicants respectfully submit that this claim also defines the present invention over the Fuller et al. reference relied on by the Examiner.

Favorable consideration and allowance of additional claims 37-41 are respectfully requested.

CONCLUSION

Since the remaining references cited by the Examiner have not been utilized to reject the claims, but merely to show the state-of- the-art, no further comments are deemed necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment(s)